

FIG. 1

## DIFFERENTIAL SIGNAL OUTPUT CIRCUIT IN FIRST EMBODIMENT

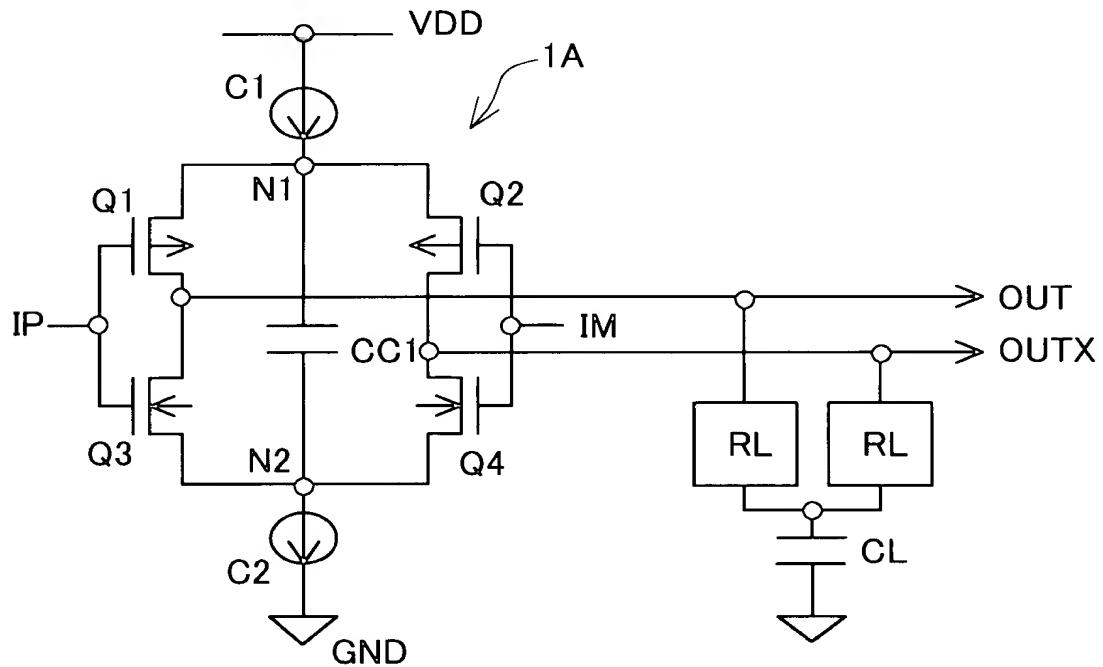


FIG. 2

## EXAMPLE OF CURRENT SOURCE IN FIRST EMBODIMENT

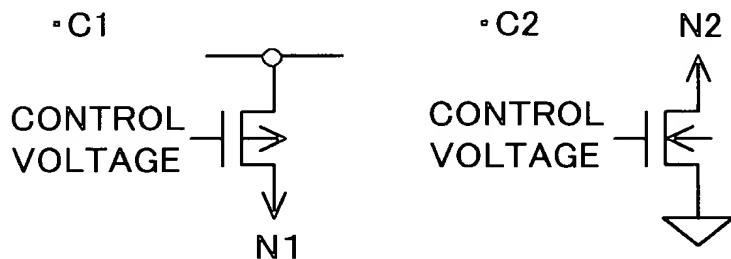


FIG. 3

## SPECIFIC EXAMPLE OF CAPACITOR IN FIRST EMBODIMENT

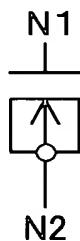


FIG. 4

SPECIFIC EXAMPLE IN FIRST EMBODIMENT

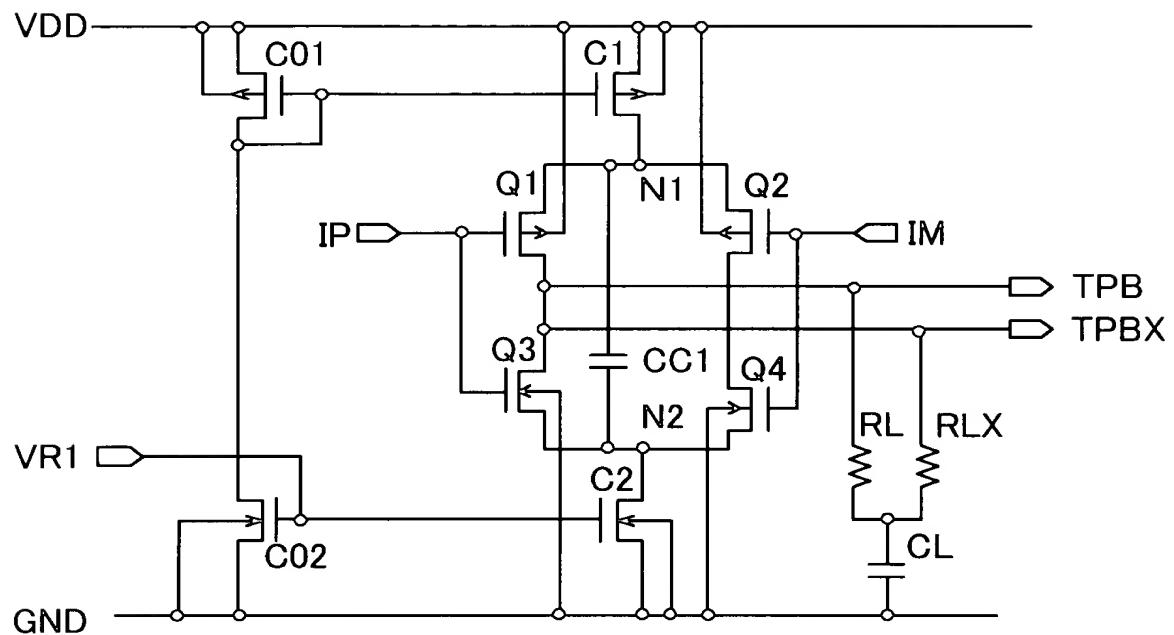


FIG. 5A

DIFFERENTIAL OUTPUT WAVEFORMS ACCORDING TO RESULT OF SIMULATION OF SPECIFIC EXAMPLE OF FIRST EMBODIMENT

PRIOR ART

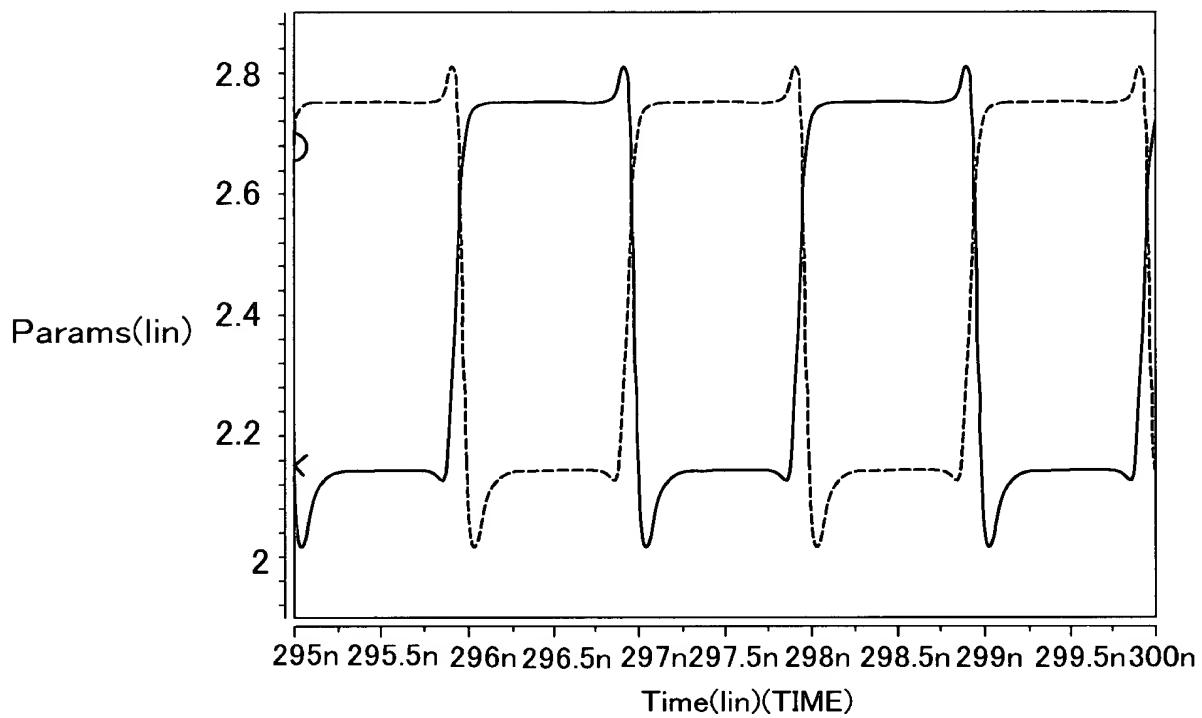


FIG. 5B

FIRST EMBODIMENT

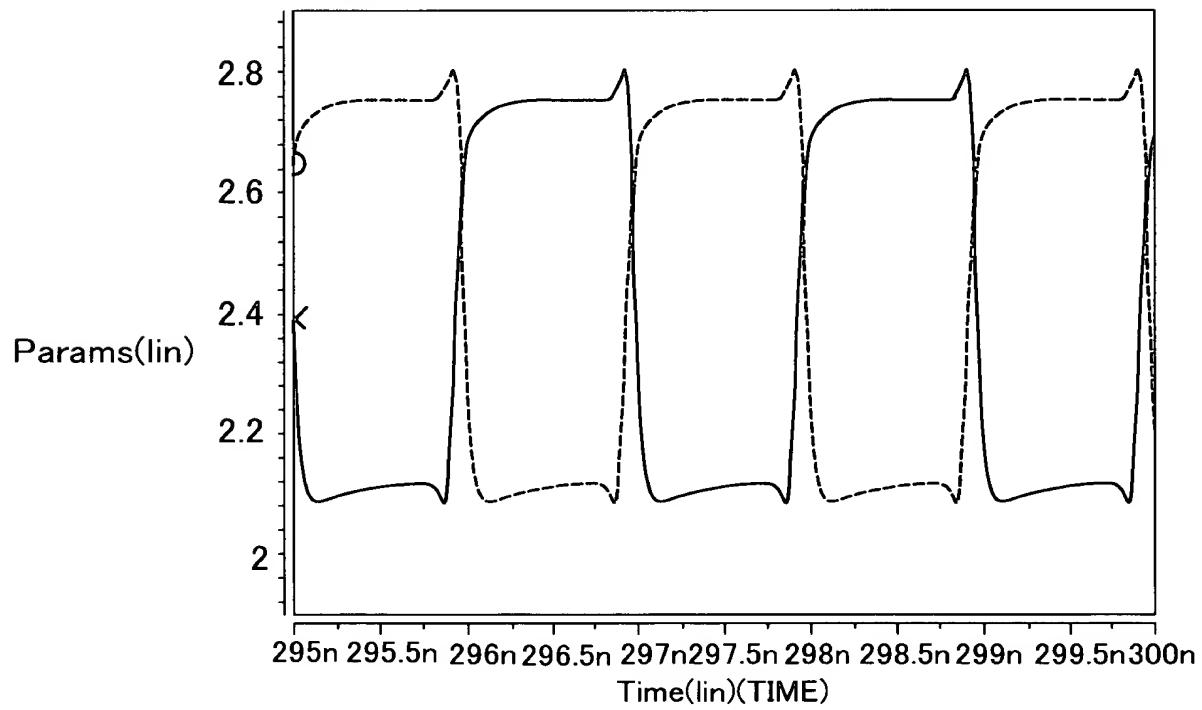


FIG. 6

LAYOUT OF DIFFERENTIAL SIGNAL OUTPUT CIRCUIT IN FIRST EMBODIMENT

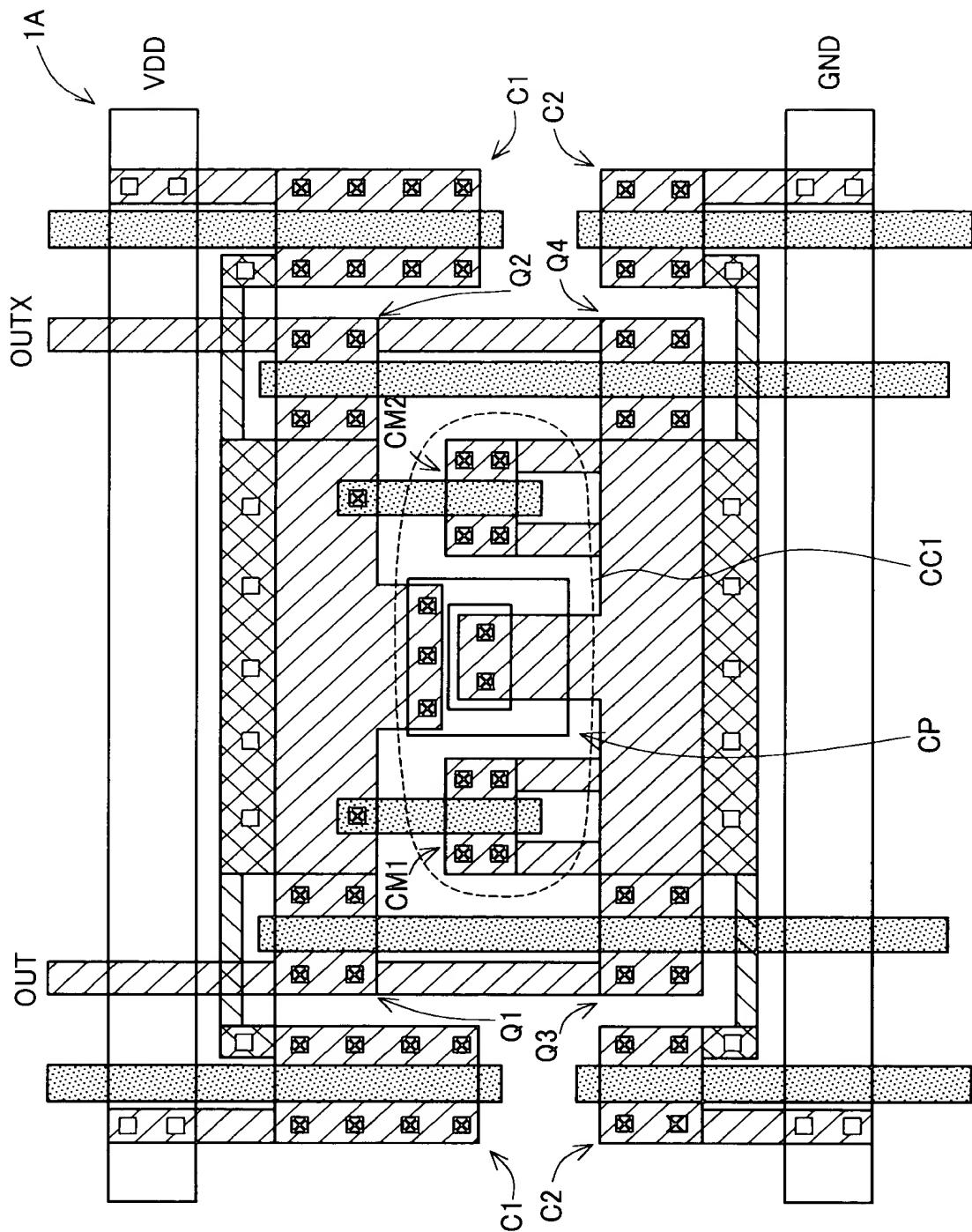


FIG. 7A

DIFFERENTIAL SIGNAL OUTPUT CIRCUIT IN SECOND EMBODIMENT

CIRCUIT STRUCTURED WITH PASSIVE LOADS

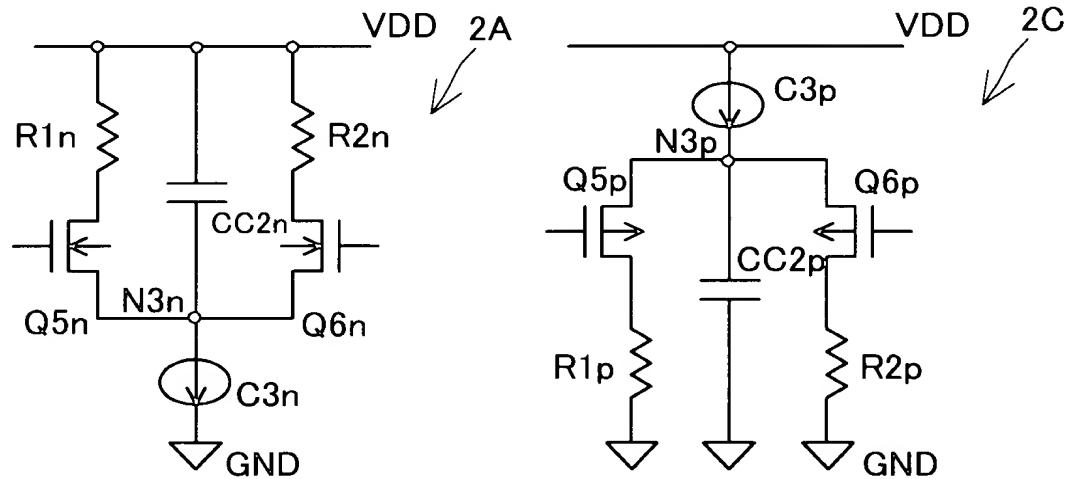


FIG. 7B

CIRCUIT STRUCTURED WITH ACTIVE LOADS

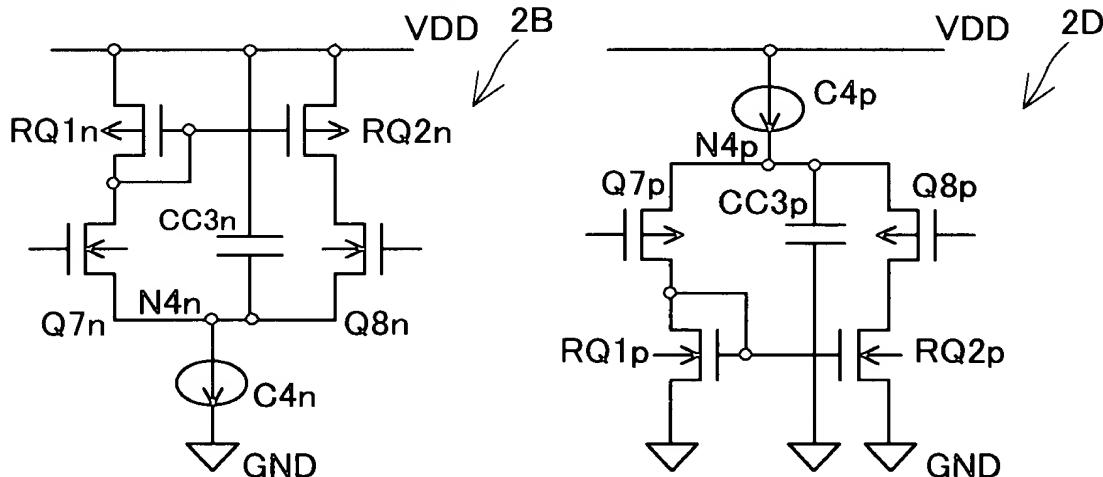


FIG. 8

BLOCK DIAGRAM ILLUSTRATING SIGNAL DETECTION APPARATUS IN THIRD EMBODIMENT

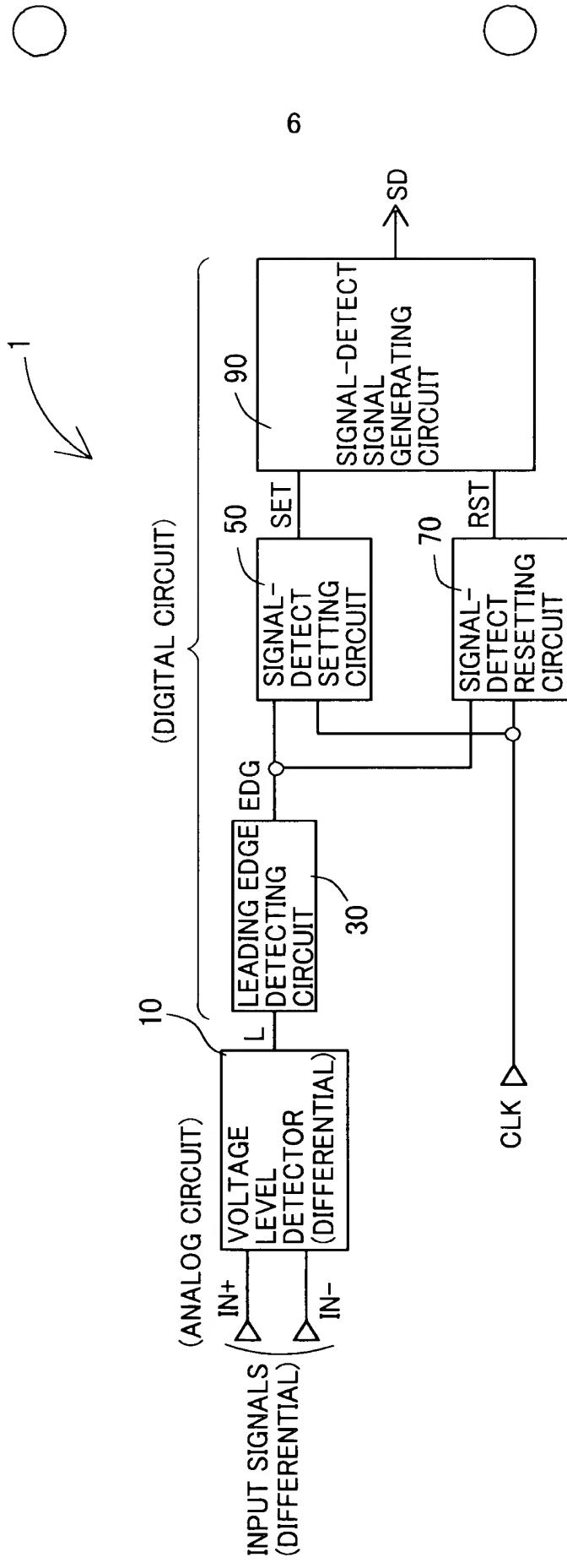
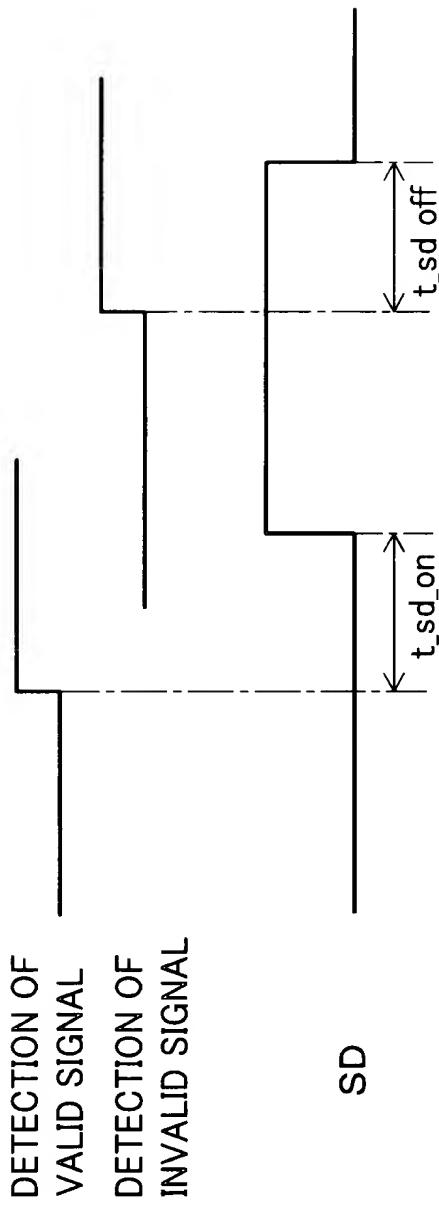


FIG. 9

TIMING PARAMETERS OF SIGNAL-DETECT SIGNALS ACCORDING TO P1394b STANDARD



SYMBOL	PARAMETER	UNIT	MIN.	MAX.
$t_{sd\_on}$	DELAY TIME FROM DETECTION OF A VALID SIGNAL UNTIL ASSERTION OF A SIGNAL-DETECT SIGNAL	$\mu$ sec	-	100
$t_{sd\_off}$	DELAY TIME FROM DETECTION OF AN INVALID SIGNAL UNTIL NEGATION OF A SIGNAL-DETECT SIGNAL	$\mu$ sec	-	$t_{sd\_on}$

FIG. 10

CODE TABLE(1)

8b10bCODES ACCORDING TO P1394b STANDARD

INPUT NAME	ABCDE 'A'B'C'D'E'F'G'H'	FGHJ RD<0	OUTPUT DATA_TABLE[1][0]	INPUT NAME	ABCDE 'A'B'C'D'E'F'G'H'	FGHJ RD>0	OUTPUT DATA_TABLE[1][1]
D0.0	00000000	1001110100	0110001011	D4.0	00100000	110101010100	0010101011
D0.4	00000001	1001110010	0110001101	D4.4	00100001	1101010010	0010101101
D0.2	00000010	1001110101	0110000101	D4.2	00100000	1101010101	0010100101
D0.6	00000011	1001110110	0110000110	D4.6	00100011	1101010110	0010100110
D0.1	00000100	1001111001	0110001001	D4.1	00100100	1101011001	0010101001
D0.5	00000101	1001111010	0110001010	D4.5	00100101	1101011010	0010101010
D0.3	00000110	1001111001	0110001100	D4.3	00100110	1101010011	0010101100
D0.7	00000111	1001111001	0110001110	D4.7	00100111	1101010001	0010101110
D16.0	000001000	0110110100	10010001011	D20.0	001010000	00101111011	00101101000
D16.4	000001001	0110110010	1001001101	D20.4	001010001	0010111101	0010110010
D16.2	000001010	0110110101	10010000101	D20.2	001010010	0010110101	0010110101
D16.6	000001011	0110110110	1001000110	D20.6	001010111	00101110110	0010110110
D16.1	000001100	0110111001	1001001001	D20.1	001011000	00101111001	0010111001
D16.5	000001101	0110111010	1001001010	D20.5	001011101	00101111010	0010111010
D16.3	000001110	0110111001	1001001100	D20.3	001011110	00101111100	0010111001
D16.7	000001111	0110111001	1001001110	D20.7	001011111	00101101111	0010110001
D8.0	000010000	1110010100	00011001011	D12.0	001100000	00110101111	0011010100
D8.4	000010001	1110010010	0001101101	D12.4	001100001	00110111101	0011010001
D8.2	000010010	1110010101	0001100101	D12.2	001100010	0011010101	0011010101
D8.6	000010011	1110010110	0001100110	D12.6	001100011	0011010110	0011010110
D8.1	000010100	1110011001	0001101001	D12.1	001101000	00110111001	00110111001
D8.5	000010101	1110011010	0001101010	D12.5	001101001	00110111010	00110111010
D8.3	000010110	1110010011	0001101100	D12.3	001101010	00110111100	0011010011
D8.7	000010111	1110010001	0001101110	D12.7	001101111	0011011110	0011010001
D24.0	000011000	1100110100	0011001011	D28.0	001110000	00111010111	0011100100
D24.4	000011001	1100110010	0011001101	D28.4	001110001	00111011101	0011100010
D24.2	000011010	1100110101	0011000101	D28.2	001110010	00111000101	0011100101
D24.6	000011011	1100110110	0011000110	D28.6	001110011	00111000110	0011100110
D24.1	000011100	1100111001	0011001001	D28.1	001110100	0011101001	0011101001
D24.5	000011101	1100111010	0011001010	D28.5	001110101	0011101010	0011101010
D24.3	000011110	1100111011	0011001100	D28.3	001110110	00111011100	0011100011
D24.7	000011111	1100111001	0011001110	D28.7	001111111	00111011110	0011100001
D2.0	010000000	1011010100	0100101011	D6.0	011000000	01100111011	0110010100
D2.4	010000001	1011010010	0100101101	D6.4	011000001	0110011101	0110010010
D2.2	010000010	1011010101	01001000101	D6.2	011000010	0110010101	0110010101
D2.6	010000011	1011010110	0100100110	D6.6	011000011	0110010110	0110010110
D2.1	010000100	1011011001	0100101001	D6.1	011000100	01100111001	0110011001
D2.5	010000101	1011011010	0100101010	D6.5	011000101	01100111010	0110011010
D2.3	010000110	1011010011	0100101100	D6.3	011000110	01100111100	0110010011
D2.7	010000111	1011010001	0100101110	D6.7	011000111	01100111110	0110010001
D18.0	010001000	0100111011	0100110100	D22.0	011010000	01101010111	0110100100
D18.4	010001001	0100111101	0100110010	D22.4	011010001	01101011101	0110100010
D18.2	010001010	0100110101	0100110101	D22.2	011010100	0110100101	0110100101
D18.6	010001011	0100110110	0100110110	D22.6	011010101	0110100110	0110100110
D18.1	010001100	0100111001	0100111001	D22.1	0110101100	0110101001	0110101001
D18.5	010001101	0100111010	0100111010	D22.5	0110101101	0110101010	0110101010
D18.3	010001110	0100111100	0100110011	D22.3	0110101110	01101011100	0110100011
D18.7	010001111	01001110111	0100110001	D22.7	0110101111	01101011110	0110100001
D10.0	010100000	0101011011	0101010100	D14.0	011100000	0111001011	0111000100
D10.4	010100001	0101011101	0101010010	D14.4	011100001	0111001101	0111000010
D10.2	010100010	0101011110	0101010001	D14.2	011100010	0111000101	0111000101
D10.6	010100011	0101010110	0101010110	D14.6	011100011	01110001110	0111000110
D10.1	0101010100	0101011001	0101011001	D14.1	011101000	0111001001	0111001001
D10.5	0101010101	0101011010	0101011010	D14.5	011101001	0111001010	0111001010
D10.3	0101010110	0101011100	0101010011	D14.3	011101010	0111001100	0111000011
D10.7	0101010111	0101011110	0101010001	D14.7	011101111	01110011110	0111001000
D26.0	010110000	01011101011	01011000100	D30.0	011110000	0111100100	10000111011
D26.4	010110001	01011101010	01011000100	D30.4	011110001	0111100010	10000111101
D26.2	010110010	01011100101	0101100101	D30.2	011110010	0111100101	1000010101
D26.6	010110011	01011100110	0101100110	D30.6	011110011	01111001110	1000010110
D26.1	010110100	01011101001	01011001001	D30.1	011111000	0111101001	10000111001
D26.5	010110101	01011101010	01011001010	D30.5	011111001	0111101010	10000111010
D26.3	010110110	01011101100	01011000111	D30.3	011111010	01111000111	10000111100
D26.7	010110111	01011101110	0101100001	D30.7	011111111	0111100001	10000111110
D1.0	100000000	0111010100	1000101011	D5.0	101000000	1010011011	1010010100
D1.4	100000001	0111010010	10001010101	D5.4	101000001	1010011101	1010010010
D1.2	100000010	0111010101	10001000101	D5.2	101000010	10100111111	1010010001
D1.6	100000011	0111010110	1000100110	D5.6	101000011	10100101110	1010010110

FIG. 11 CODE TABLE(2)  
8b10bCODES ACCORDING TO P1394b STANDARD

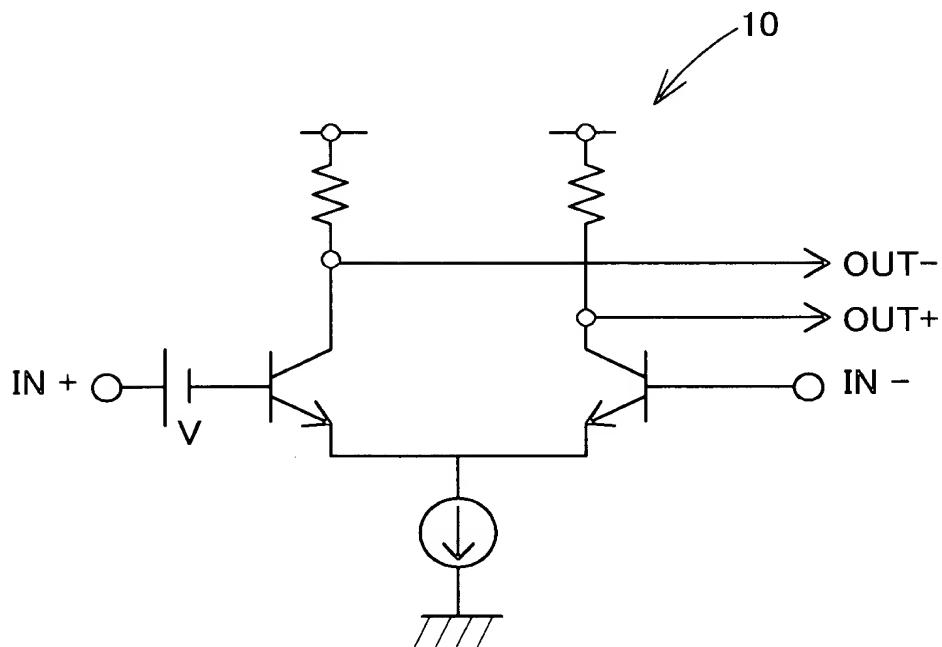
INPUT	ABCDEI	FGHJ	OUTPUT	INPUT	ABCDEI	FGHJ	OUTPUT
NAME	A'B'C'D'E'F'G'H'		RD<0	NAME	A'B'C'D'E'F'G'H'		RD>0
I	DATA_TABLE[1][0]		DATA_TABLE[1][1]	I	DATA_TABLE[1][0]		DATA_TABLE[1][1]
D1.1	10000100	0111011001	1000101001	D5.1	10100100	1010011001	1010011001
D1.5	10000101	0111011010	1000101010	D5.5	10100101	1010011010	1010011010
D1.3	10000110	0111010011	1000101100	D5.3	10100110	1010011100	1010010011
D1.7	10000111	0111010001	1000101110	D5.7	10100111	1010011110	1010010001
D17.0	10001000	1000111011	1000110100	D21.0	10101000	1010101011	1010100100
D17.4	10001001	1000111101	1000110010	D21.4	10101001	1010101101	1010100010
D17.2	10001010	1000110101	1000110101	D21.2	10101010	1010101111	1010101111
D17.6	10001011	1000110110	1000110110	D21.6	10101011	1010100110	1010100110
D17.1	10001100	1000111001	1000111001	D21.1	10101100	1010110111	1010110111
D17.5	10001101	1000111010	1000111010	D21.5	10101101	1010110111	1010110111
D17.3	10001110	1000111100	1000110011	D21.3	10101110	1010101100	1010100011
D17.7	10001111	1000110111	1000110001	D21.7	10101111	1010101110	1010100001
D9.0	10010000	1001011011	1001010100	D13.0	10110000	1011001011	1011000100
D9.4	10010001	1001011101	1001010010	D13.4	10110001	1011001101	1011000010
D9.2	10010010	1001010001	1001010001	D13.2	10110010	1011000101	1011000101
D9.6	10010011	1001010110	1001010110	D13.6	10110011	1011001110	1011000110
D9.1	10010100	1001011001	1001011001	D13.1	10110100	1011001001	1011001001
D9.5	10010101	1001011010	1001011010	D13.5	10110101	1011001010	1011001010
D9.3	10010110	1001011100	1001010011	D13.3	10110110	1011001100	1011000011
D9.7	10010111	1001011110	1001010001	D13.7	10110111	1011001110	1011001000
D25.0	10011000	1001101011	1001100100	D29.0	10111000	1011100100	0100011011
D25.4	10011001	1001101101	1001100010	D29.4	10111001	1011100010	0100011101
D25.2	10011010	1001100101	1001100101	D29.2	10111010	1011100101	0100010707
D25.6	10011011	1001100110	1001100110	D29.6	10111011	1011100110	0100010110
D25.1	10011100	1001101001	1001101001	D29.1	10111100	1011101001	0100011001
D25.5	10011101	1001101010	1001101010	D29.5	10111101	1011101010	0100011010
D25.3	10011110	1001101100	1001100011	D29.3	10111110	1011100011	0100011100
D25.7	10011111	1001101110	1001100001	D29.7	10111111	1011100001	0100011110
D3.0	11000000	1100011011	1100010100	D7.0	11100000	1110001011	0001110100
D3.4	11000001	1100011101	1100010010	D7.4	11100001	1110001101	0001110010
D3.2	11000010	1100010101	1100010101	D7.2	11100010	1110001011	0001110101
D3.6	11000011	1100010110	1100010110	D7.6	11100011	1110001110	0001110110
D3.1	11000100	1100011001	1100011001	D7.1	11100100	1110001001	0001111001
D3.5	11000101	1100011010	1100011010	D7.5	11100101	1110001010	0001111010
D3.3	11000110	1100011100	1100010011	D7.3	11100110	1110001100	0001110011
D3.7	11000111	1100011110	1100010001	D7.7	11100111	1110001110	0001111001
D19.0	11001000	1100101011	1100100100	D23.0	11101000	1110100100	0001011011
D19.4	11001001	1100101101	1100100010	D23.4	11101001	1110100010	0001011101
D19.2	11001010	1100100101	1100100101	D23.2	11101010	1110100101	0001010101
D19.6	11001011	1100100110	1100100110	D23.6	11101011	1110100110	0001010110
D19.1	11001100	1100101001	1100101001	D23.1	11101100	1110101001	0001011001
D19.5	11001101	1100101010	1100101010	D23.5	11101101	1110101010	0001011010
D19.3	11001110	1100101100	1100100011	D23.3	11101110	1110100011	0001011100
D19.7	11001111	1100101110	1100100001	D23.7	11101111	1110100001	0001011110
D11.0	11010000	1101001011	1101000100	D15.0	11110000	0101110100	1010001011
D11.4	11010001	1101001101	1101000010	D15.4	11110001	0101110010	1010001101
D11.2	11010010	1101000101	1101000101	D15.2	11110010	0101110101	1010000101
D11.6	11010011	1101000110	1101000110	D15.6	11110011	0101110110	1010000110
D11.1	11010100	1101001001	1101001001	D15.1	11110100	0101111001	1010001001
D11.5	11010101	1101001010	1101001010	D15.5	11110101	0101111010	1010001010
D11.3	11010110	1101001100	1101000011	D15.3	11110110	0101111001	1010001100
D11.7	11010111	1101001110	1101001000	D15.7	11110111	0101111001	1010001110
D27.0	11011000	1101100100	0010011011	D31.0	11111000	1010110100	0101001011
D27.4	11011001	1101100010	0010011101	D31.4	11111001	1010110010	0101001101
D27.2	11011010	1101100101	0010010101	D31.2	11111010	1010110101	0101000101
D27.6	11011011	1101100110	0010010110	D31.6	11111011	1010110110	0101000110
D27.1	11011100	1101101001	0010011001	D31.1	11111100	1010111001	0101001001
D27.5	11011101	1101101010	0010011010	D31.5	11111101	1010111010	0101001010
D27.3	11011110	1101100011	0010011100	D31.3	11111110	1010110011	0101001100
D27.7	11011111	1101100001	0010011110	D31.7	11111111	1010110001	0101001110



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FIG. 12

SPECIFIC EXAMPLE VOLTAGE LEVEL DETECTOR IN THIRD EMBODIMENT



10  
IN + V IN - OUT - OUT +

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## SPECIFIC EXAMPLE OF SIGNAL-DETECT SETTING CIRCUIT IN THIRD EMBODIMENT

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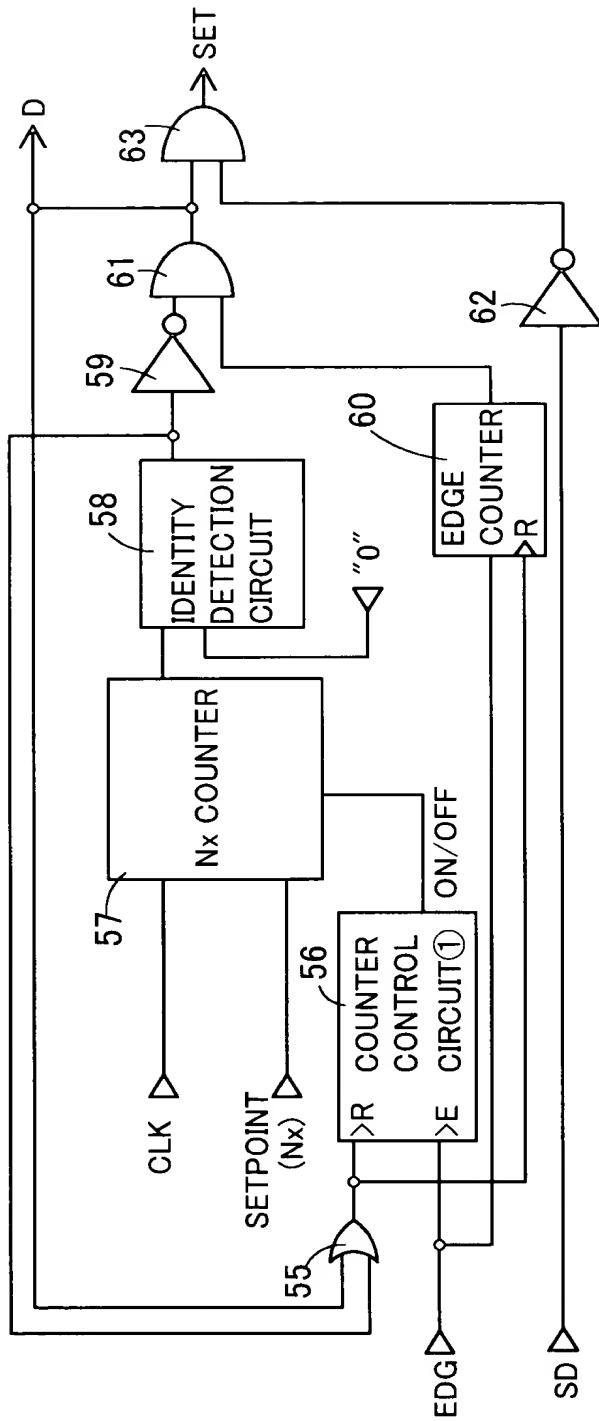


FIG. 14

SPECIFIC EXAMPLE OF SIGNAL-DETECT RESETTING CIRCUIT IN THIRD EMBODIMENT

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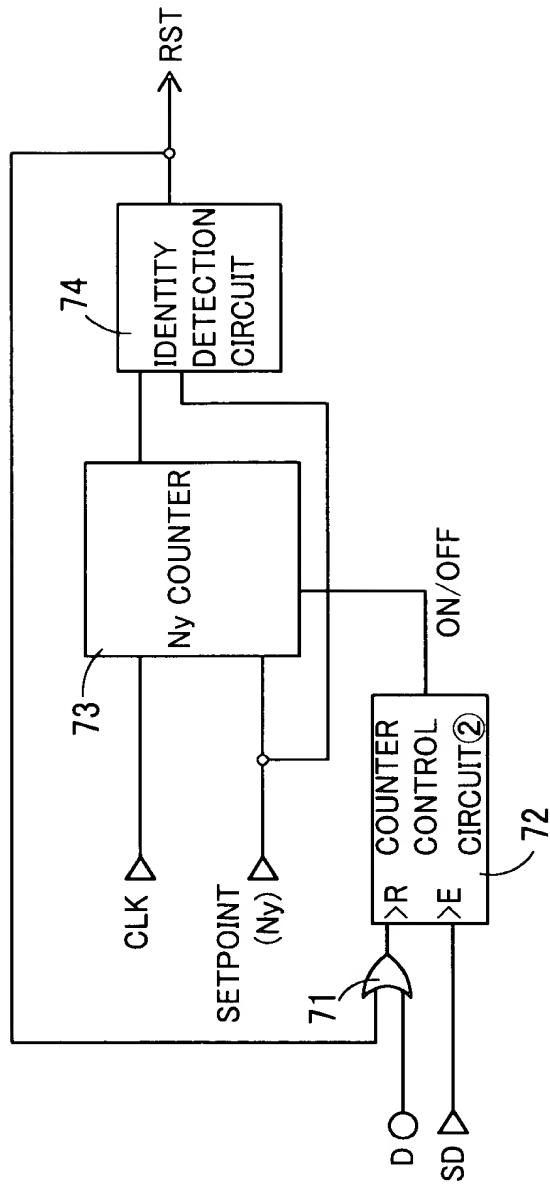


FIG. 15 SIGNAL-DETECT SIGNAL SETTING SEQUENCE

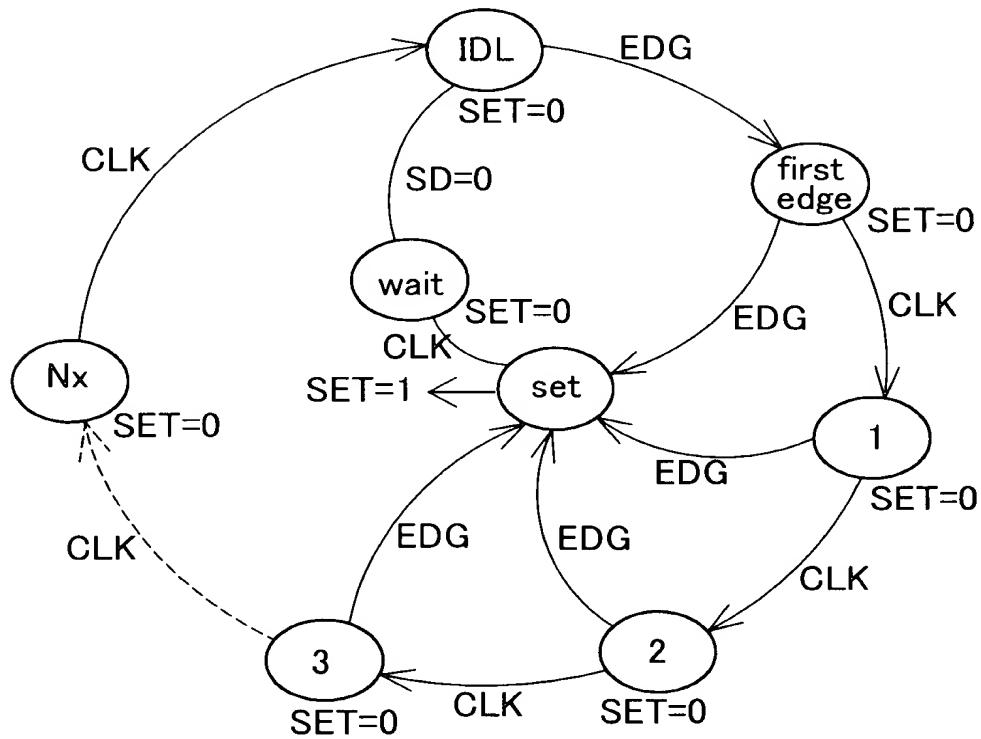


FIG. 16 SIGNAL-DETECT SIGNAL RESETTING SEQUENCE

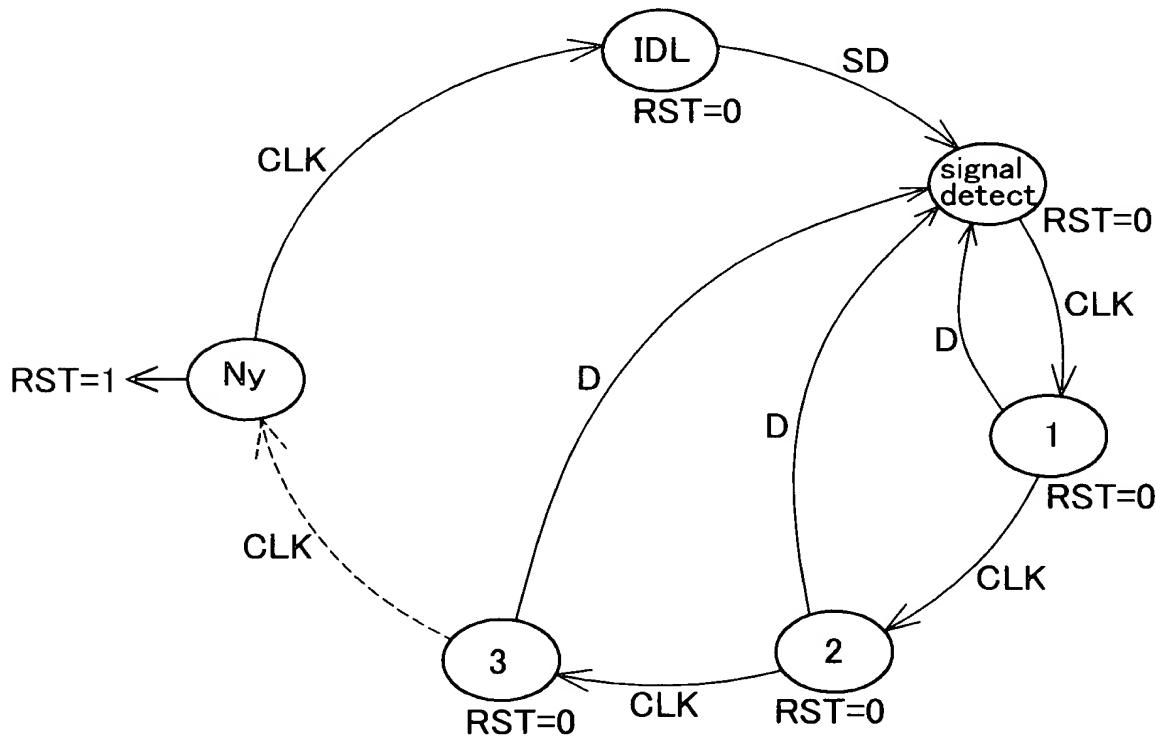
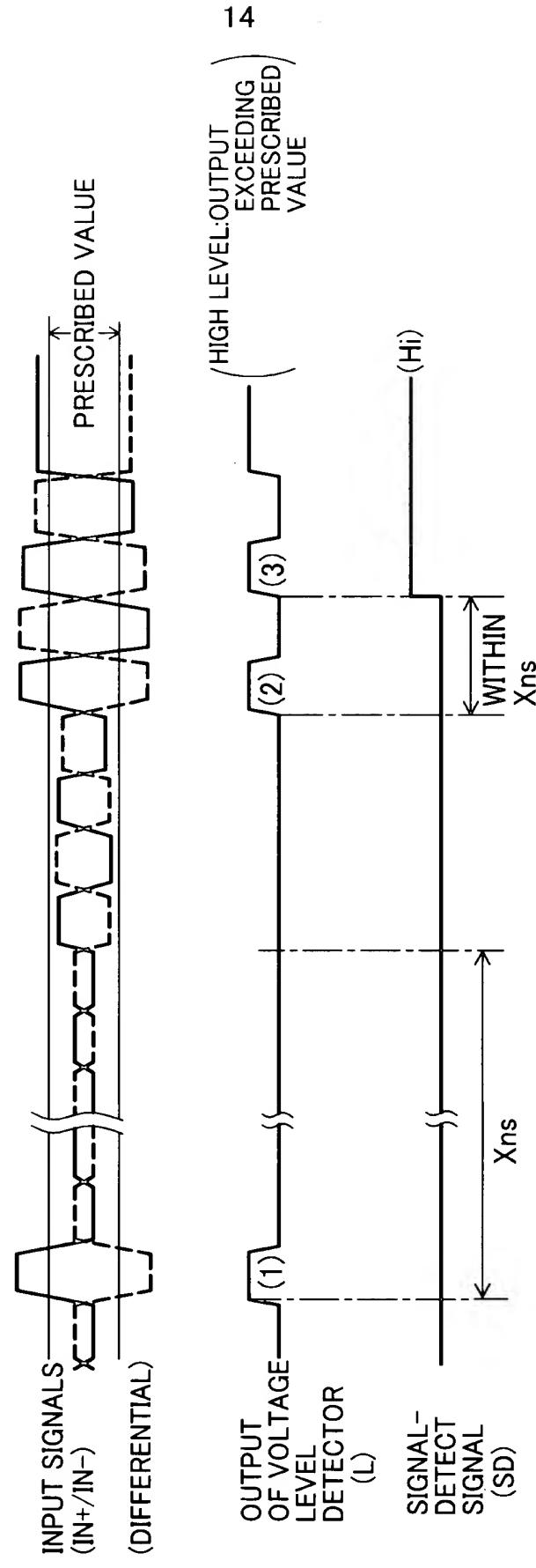


FIG. 17

TIME CHART SHOWING SIGNAL-DETECT SIGNAL SETTING SEQUENCE



TIME CHART SHOWING ACTIONS DURING SIGNAL-DETECT SIGNAL SETTING

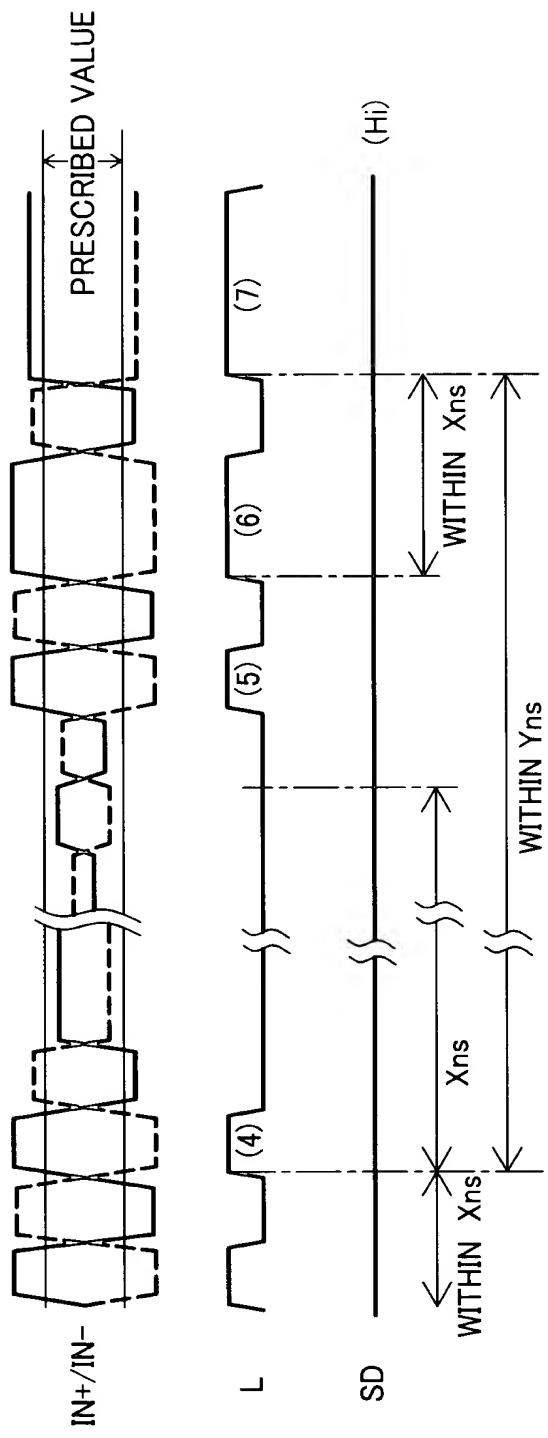


FIG. 18

TIME CHART SHOWING SIGNAL-DETECT SIGNAL RESETTING SEQUENCE

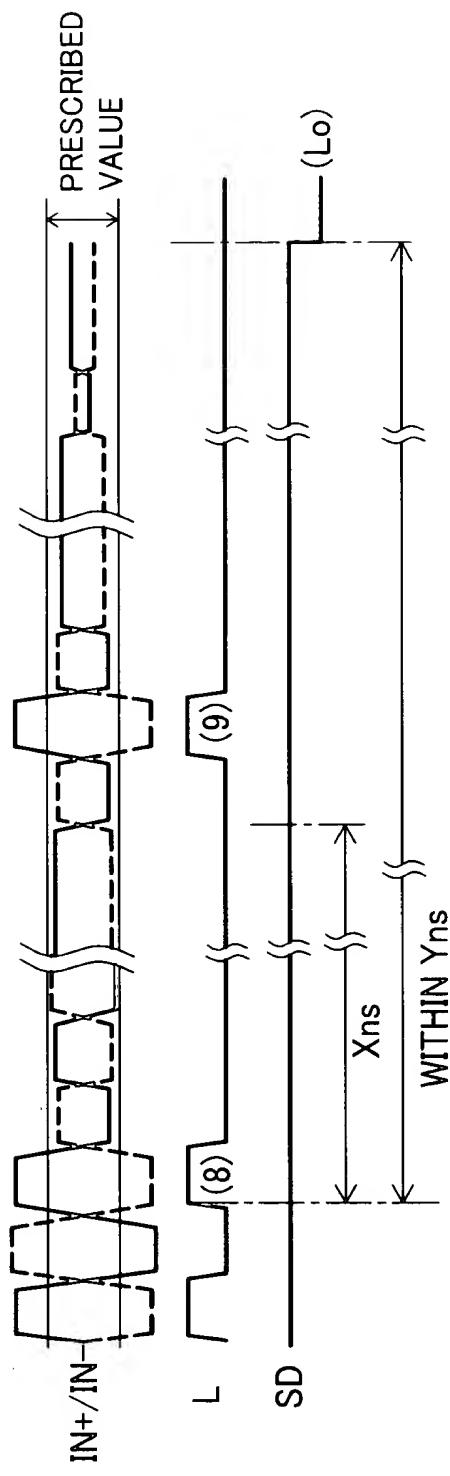


FIG. 19

FIG. 20

CONFIGURATIONAL DIAGRAM OF SIGNAL DETECTION APPARATUS  
IN FOURTH EMBODIMENT

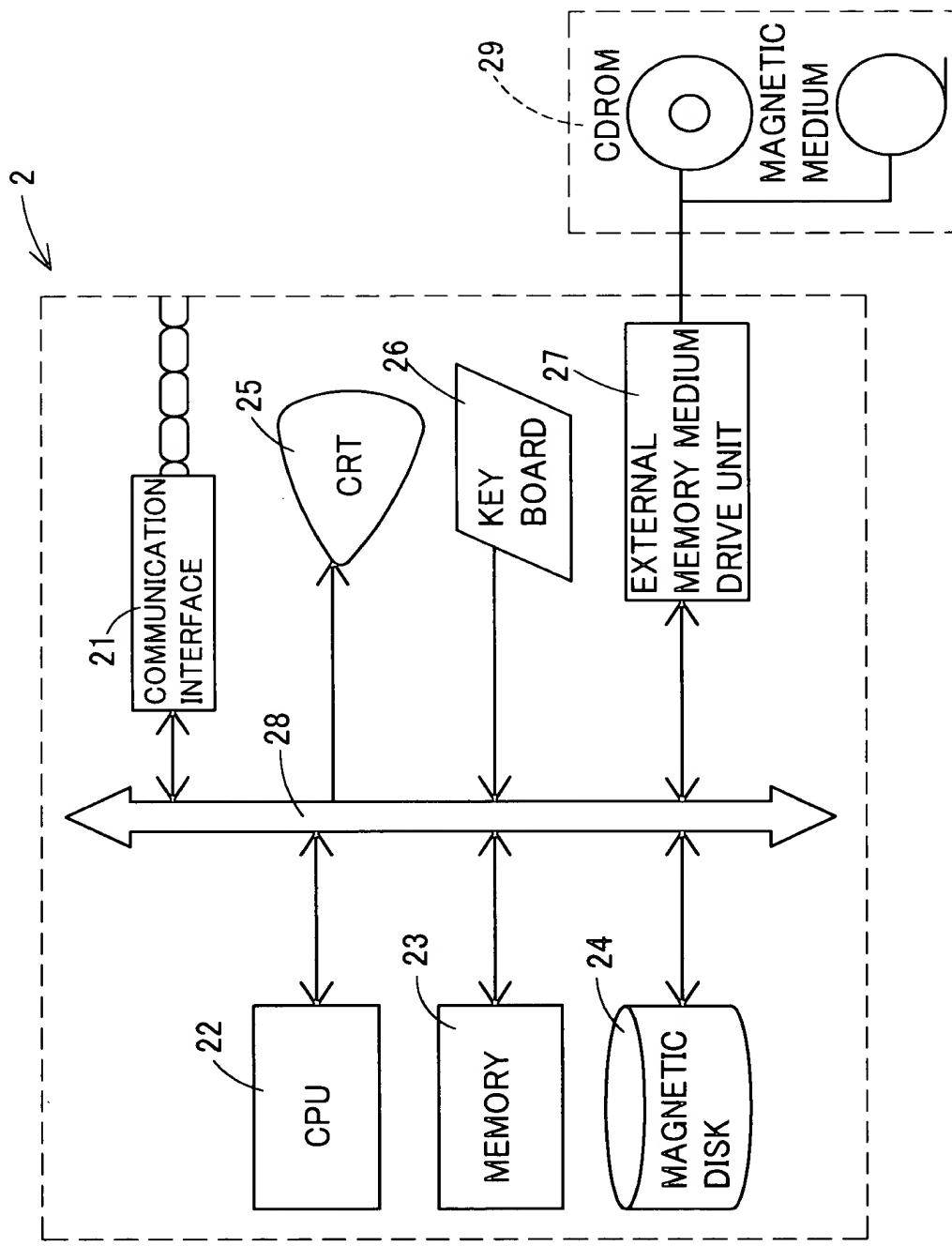
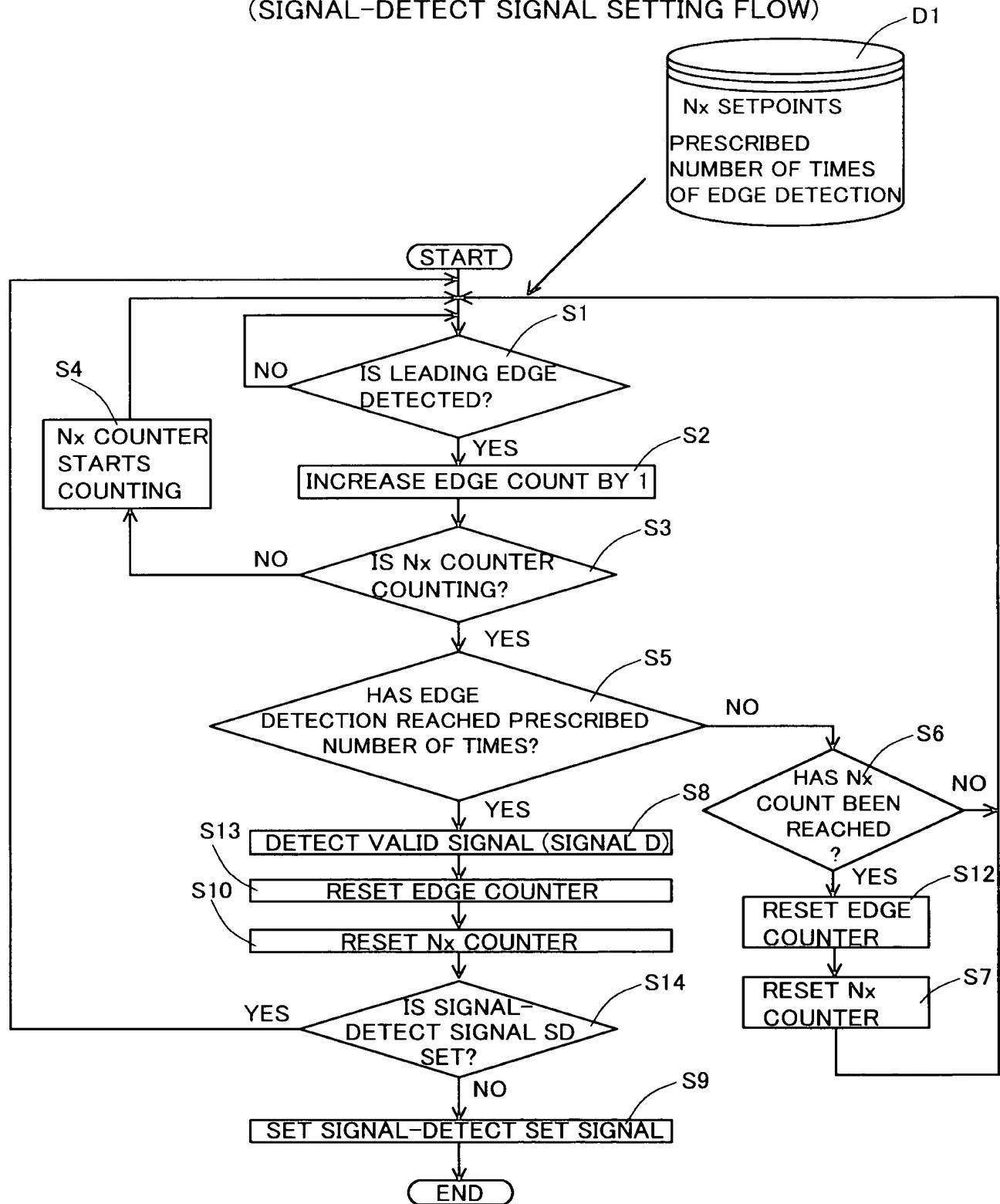


FIG. 21

SIGNAL DETECTION METHOD EXECUTED BY SIGNAL DETECTION APPARATUS IN FOURTH EMBODIMENT  
(SIGNAL-DETECT SIGNAL SETTING FLOW)



**FIG. 22** SIGNAL DETECTION METHOD EXECUTED BY SIGNAL DETECTION APPARATUS IN FOURTH EMBODIMENT  
(SIGNAL-DETECT SIGNAL RESETTING FLOW)

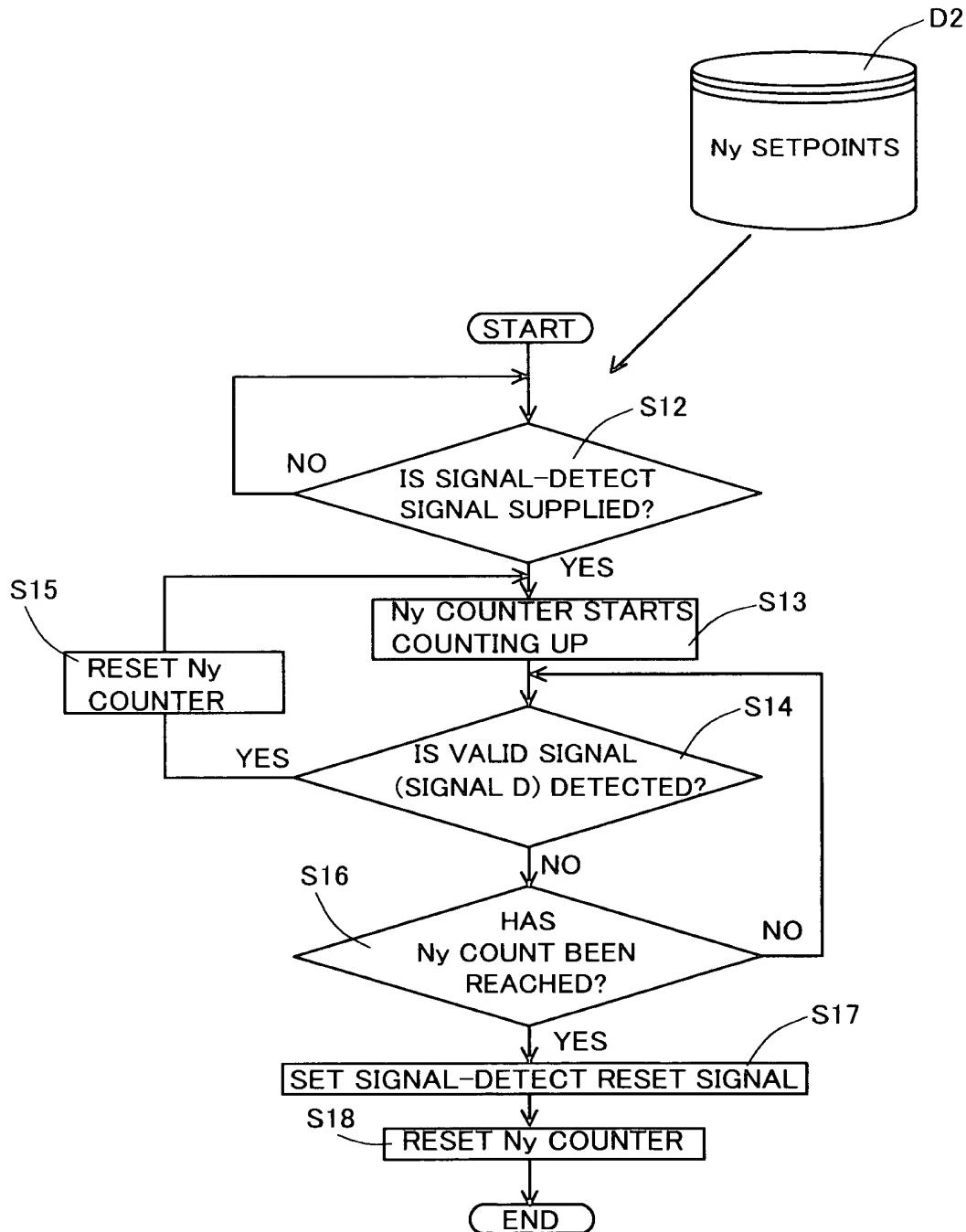


FIG. 23

## EXAMPLE OF DIFFERENTIAL SIGNAL TRANSMISSION SYSTEM

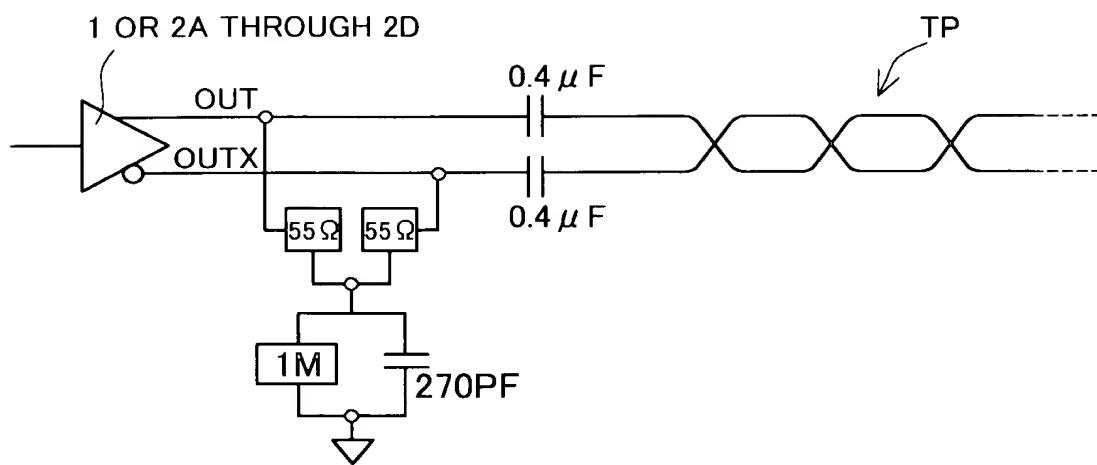
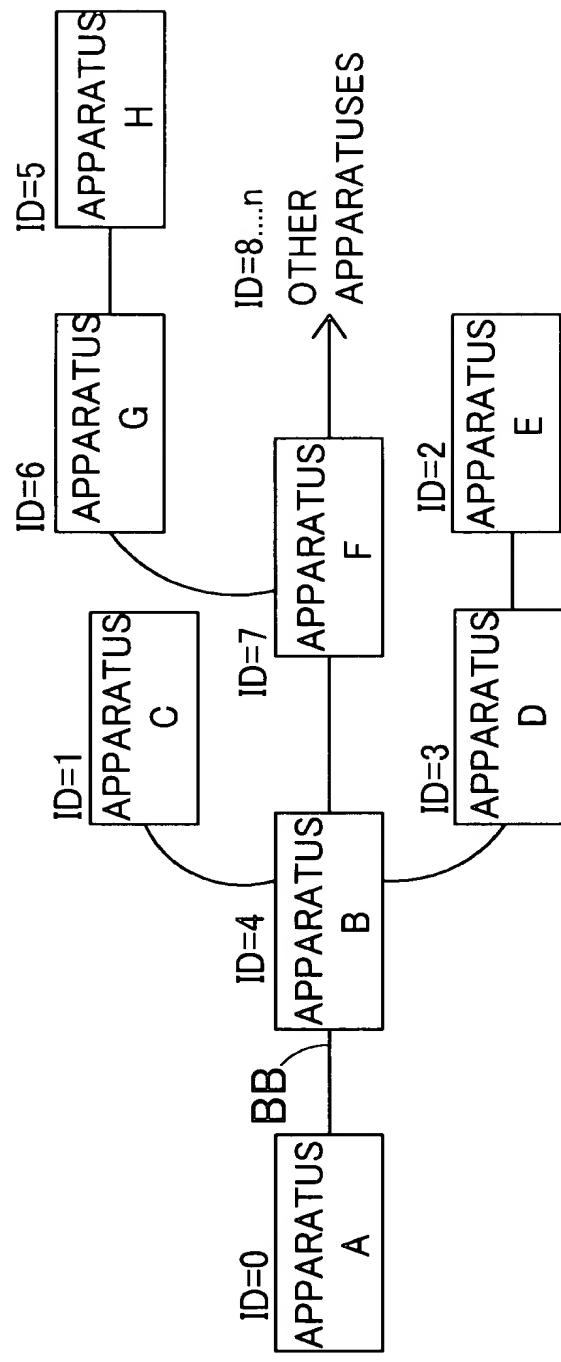


FIG. 24

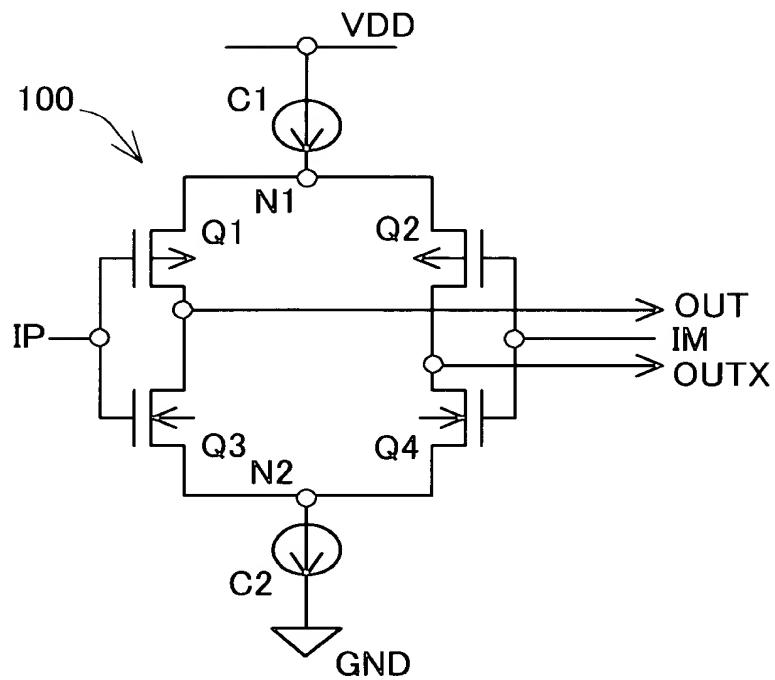
EXAMPLE OF SIGNAL TRANSMISSION SYSTEM CONFIGURATION

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**FIG. 25**      **PRIOR ART**

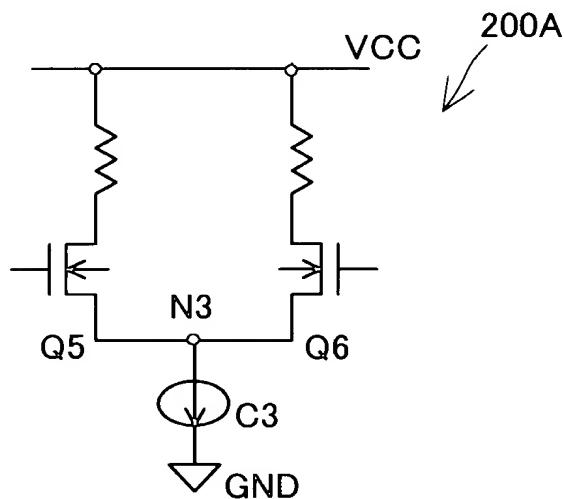
DIFFERENTIAL SIGNAL OUTPUT CIRCUIT ACCORDING  
TO PRIOR ART



**FIG. 26A      PRIOR ART**

ANOTHER DIFFERENTIAL SIGNAL OUTPUT CIRCUIT ACCORDING  
TO PRIOR ART

CIRCUIT WITH PASSIVE LOADS



**FIG. 26B**

CIRCUIT WITH ACTIVE LOADS

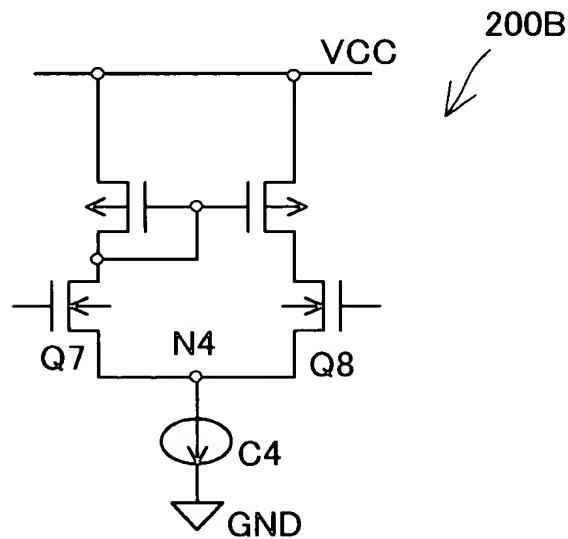


FIG. 27 PRIOR ART

## SIGNAL DETECTION APPARATUS ACCORDING TO PRIOR ART

